REMARKS

By this paper, the independent claims 23 and 24 and depending claims 2, 4 – 11 and 14 – 16 are presented for reconsideration in view of the amendments and remarks herein.

In the Office Action, the claims were rejected under 35 U.S.C. § 103(a) as obvious in view of U. S. Patent Publication US 2002/0133970 (Gordon et al.), or as obvious over Gordon et al. as combined with either U. S. Patent Publication US 2003/0081430 (Becker)[1] (cited as teaching the use of an insulating air gap between the heat sink and casing), or U. S. Patent No. 5,213,103 (Martin et al.) (cited as teaching an epoxy containing heat conducting particles).

As defined in the independent claims, applicant's dental curing device is comprised of an elongated hollow housing having a proximal end and a distal end, with a handle portion disposed between the proximal and distal ends. A light source disposed at the distal end of the housing, with electronic circuitry disposed within the handle portion of the housing for controlling the light source. A heat sink is disposed within the elongated hollow housing for transferring heat generated by the light source away from the distal end and for dissipating the heat that is transferred away from the light source. The heat sink comprises "first and second portions which are juxtaposed end-to-end and which together essentially fill the elongated hollow housing." The first portion of the heat sink comprises "a first elongated solid metallic portion having proximal and distal ends, said distal end in thermal contact with the light source and extending from the light source and essentially filling the hollow elongated housing from the distal end to the handle portion of the elongated housing." The second portion of the heat sink comprises "a second elongated portion comprised of a polymer-based material that is not electrically conductive, said second portion being juxtaposed and in thermal contact with the first elongated solid metallic portion at its proximal end, said second elongated portion extending through and essentially filling said handle portion of the hollow housing and surrounding at least a portion of the electronic circuitry contained therein."[2]

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[1] As stated in the last response, Becker qualifies as "prior" art, if at all, under 35 U.S.C. § 1-2(a). Applicant continues to reserve the right to challenge whether Becker is a proper qualifying reference, and thus any remarks or arguments in respect to Becker should be understood as being made simply assuming for purposes of the argument that Becker is a qualifying reference.

[2] Independent claim 24 is similar to claim 23 and additionally adds an insulating layer that surrounds the first elongated solid metallic portion.

The claimed structure of applicant's heat sink for the dental curing device advantageously conducts heat quickly away from the light source by virtue of the elongated solid metallic first portion which essentially fills the hollow housing from the light source up to the handle portion. The heat is then effectively dissipated by the elongated second portion, which fills the handle portion and is juxtaposed with the solid metallic portion. The elongated second portion of the heat sink fills the hollow handle and surrounds the electronic circuitry. Because it is a polymer-based material that is not electrically conductive the second portion of the heat sink both surrounds the circuitry and protects it, while at the same time dissipating heat through the handle portion of the device.

In effect, the first metallic portion rapidly conducts heat away from the light source so that the working tip or end of the light curing device, which is used in and around a patient's mouth and soft tissue, does not become too hot and likely to hurt or injure the patient. The second portion of the heat sink, in the handle, then dissipates the heat. This effectively improves the heat dissipation characteristics of the overall heat sink structure.

As claimed, this is in distinct contrast to the prior art of record. Gordon et al. discloses two different embodiments of a heat sink for a dental curing device. The Fig. 9 embodiment of Gordon does not anticipate or make obvious applicant's heat sink structure, as claimed. Gordon's metallic tube or heat transfer element 208 is *surrounded* by the thermally conductive epoxy material 214 around the *outside* of the hollow metallic tube 208. Unlike Gordon's Fig. 9 embodiment applicant's claimed structure does not include a first metallic heat transfer tube 208 surrounded by an epoxy material 214. Rather, applicant's claimed structure includes "a first elongated *solid* metallic portion having proximal and distal ends, said distal end in thermal contact with the light source and extending from the light source *and essentially filling the hollow elongated housing from the distal end to the handle portion of the elongated housing*," and "a second elongated portion comprised of a polymer-based material that is not electrically conductive, said second portion being *juxtaposed* and in thermal contact with the first elongated solid metallic portion *at its proximal end*, said second elongated portion extending through *and essentially filling said handle portion of the hollow housing* and surrounding at least a portion of the electronic circuitry contained therein." (Claims 23 and 24, emphasis added). Thus, in applicant's claimed structure the first or metallic portion is situated adjacent, or next to, the epoxy portion so as to be in thermal contact at the ends that abut one another. Gordon et al.'s

heat sink has the first portion or heat transfer element 208 surrounding the second or epoxy portion 214, all of which is contained in the outer tube 204 that is operatively used in the patient's mouth. No part of the heat sink in this embodiment is in the handle, but rather is located near the operative portion used in the mouth, which is not desirable and contrary to applicant's device, which moves the heat away from the operative portion to the handle portion. Moreover, the metallic portion is surrounded by the polymer-based material, unlike applicant's claimed invention in which the metallic part of the heat sink is located at the working end of the curing device in contact with the light source for rapid heat transfer away from the light source, and a second epoxy portion located in the handle (not surrounding the metallic heat sink).

The second embodiment of Gordon et al. discloses (Fig. 10) an alternative heat sink arrangement which consists of a metal body 314 joined to the end of the metallic tube or heat transfer element 208. The Office Action notes that Gordon states that the "heat sink 314 includes a metal (*or other thermally conductive material*)," (¶ [0044], emphasis added), and thus concludes that it would be obvious to form the alternative heat sink or metal body 314 from the thermally conductive material disclosed as being used (e.g. the material 214 used to surround the metal tube 208) in the Fig. 9 embodiment.

Even if this substitution were appropriate[3] it does not result in the dental curing device as claimed in claims 23 and 24. Applicant's claimed structure includes "a first elongated *solid* metallic portion having proximal and distal ends, said distal end in thermal contact with the light

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[3] As noted in the Interview Summary conducted following the last Office Action, "It was pointed out that Gordon specifically states that in the embodiment shown in Fig. 10 *rather* than utilizing the conductive epoxy, metal is used, and therefore, . . . it is not obvious to change the location of the element." (Emphasis added). As further noted in the Interview Summary, it was also argued that "even if the foregoing were not true, combining the two embodiments would result in a device opposite from the claims because the epoxy would be situated toward the light emitting end, not in the handle as claimed." Specifically, the disclosure treats these embodiments as *separate and distinct* alternatives to one another, stating that "*Rather than utilizing a thermally conductive epoxy that surrounds heat transfer element 208* [e.g., rather than using the first embodiment], heat sink 314 includes a metal (or other thermally conductive material) body joined to the opposite end of heat transfer element 208 as mount 210." Page 4, ¶ [0044] (Bracketed statement and emphasis added).

At most, Gordon et al. discloses that "While heat sinks 214 and 314 are shown used exclusively of each other in the depicted embodiments, it will be appreciated that heat sinks 214 and 314 may also be used together in a single curing system." Id. at ¶ [0045]. But even this fails to anticipate or make obvious the claimed invention. This would simply result in a light curing device in which the tube 204 that constitutes the working tip of the device would have a metallic heat transfer element 208 surrounded by the epoxy heat sink 214 in the tube or working tip, and a metallic heat sink portion 314 in the handle portion. This arrangement, even if adopted, would be essentially opposite to applicant's claimed light curing device, as noted above. And clearly there is no motivation or suggestion to alter or interchange the placement of the metallic heat sink 314 with the epoxy heat sink 214. Indeed, doing so would make no sense in the context of Gordon et al. since then the metallic heat sink 314 would constitute yet a further layer of metal surrounding the already metallic "heat transfer element" or inner tube 208.

source and extending from the light source *and essentially filling the hollow elongated housing from the distal end to the handle portion of the elongated housing*," and "a second elongated portion comprised of a polymer-based material that is not electrically conductive, said second portion being juxtaposed and in thermal contact with the first elongated solid metallic portion at its proximal end, said second elongated portion extending through *and essentially filling said handle portion of the hollow housing* and surrounding at least a portion of the electronic circuitry contained therein." (Claims 23 and 24, emphasis added). At most, the asserted substitution of Gordon's epoxy material from the heat sink 214 of the Fig. 9 would result in a *hollow* metallic tube 208 at one end joined to a *semi-circular* epoxy heat sink 314 at the other end. Neither of these is solid so as to essentially fill the handle portion. Moreover, there is nothing in Gordon to show how or even if the semi-circular heat sink 314 would surround the electronic circuitry.

For at least the foregoing reasons, the claims are neither anticipated nor made obvious by Gordon et al., either singly or in combination with any other reference of record. Accordingly, favorable reconsideration and allowance is respectfully requested.

In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney.

Dated this 15th day of November, 2006.

Respectfully submitted,

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